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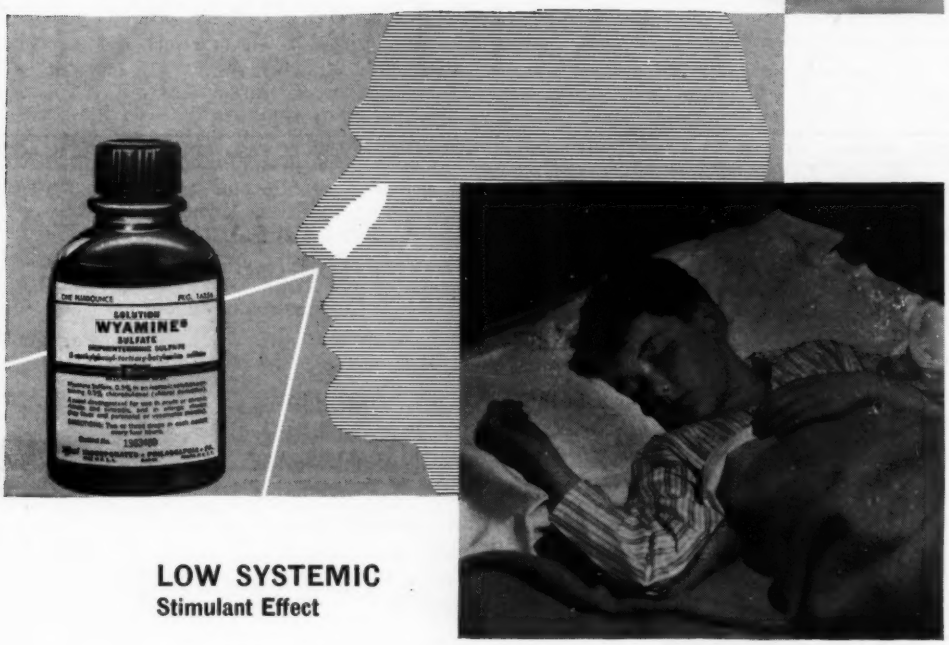

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300 PHYSICIANS ATTEND ANNUAL SOUTHWESTERN MEDICAL CONFERENCE

Dr. James E. Walsh of Douglas, Ariz., was installed as president of the Southwestern Medical Association at the annual meeting in El Paso Oct. 18-20.

Upwards of 300 physicians attended the three-day convention which was marked by an exceptionally fine scientific program. Sessions were held in the Hotel Cortez.

Other officers installed with Dr. Walsh were Dr. Wesley Connor of Albuquerque, N. M., president-elect; Dr. Celso Stapp of El Paso, first vice-president; Dr. Joseph Bank of Phoenix, Ariz., second vice-president; Dr. C. M. Thompson of Albuquerque, N. M., third vice-president; and Dr. W. W. Schuessler of El Paso, re-elected secretary-treasurer. Dr. Louis W. Breck of El Paso is immediate past-president.

Generally assembly of convention delegates was held Thursday morning Oct. 18 in the Hotel Cortez. Dr. Stapp, convention general chairman for the host El Paso County Medical Society, gave the opening address with a welcome extended by Dr. Frank Schuster, president of the El Paso County Medical Society. Dr. Breck gave the response.

Morning and afternoon scientific sessions were held Thursday and Friday with a morning session on Saturday. The increasingly popular luncheon round-tables were continued at the convention with splendid attendance at both the surgical and medical discussions.

GUEST SPEAKERS

Among the speakers were Dr. Edgar Burns, Professor and Chairman of the Department of Urology, Tulane University Medical School; Dr. Edward H. Reinhard, Associate Professor of Medicine at Washington University in St. Louis; Dr. Elmer C. Bartels of Lahey Clinic in Boston; Dr. Edwin H. Ellison, Assistant Professor of Surgery at Ohio State University; Dr. E. T. Bell, Emeritus Professor of Pathology at the University of Minnesota Medical School; and Dr. Charles J. Smith, Associate in the Henry Schmitz Medical Group of Chicago. Dr. Smith presented the material of Dr. Herbert E. Schmitz, Professor and Chairman of the Department of Obstetrics and Gynecology at Strich School of Medicine, Loyola University. Dr. Schmitz was unable to attend because of illness.

An extensive program of entertainment was provided for the wives of convention delegates by members of the Woman's Auxiliary of the El Paso County Medical Society. A similar program was also arranged for the physicians, including a golf tournament, skeet shoot and attendance at a football game between Texas Western College and the University of New Mexico.

DR. WATKINS HONORED

Dr. W. Warner Watkins of Phoenix was honored at the annual banquet with a citation for 30 years of service to the Southwestern Medical Association. Dr. Watkins was editor of SOUTHWESTERN MEDICINE for 12 years and served as secretary-treasurer of the Association for 10 years. He was president of the Association in 1920. In addition to the citation, Dr. Watkins was also presented with a lifetime membership in the Association.

Principal work at the annual business meeting was to extend the boundaries of the Association to include more of West Texas. Association members agreed to invite physicians in such cities as Abilene, Amarillo, San Angelo and Lubbock to join the group for its annual convention. Greater participation by physicians in the states of Northern Mexico was also urged by convention delegates. It was agreed that the registration fee for physicians in Mexico should be reduced from 10 dollars to 10 pesos because of the current exchange rate.

Papers of the convention's guest speakers, including a history of the Southwestern Medical Association by Dr. Watkins, will be published in future editions of SOUTHWESTERN MEDICINE.

OBSTETRICS—VITAMIN K

Vitamin K In The Prevention Of Hemorrhagic Disease Of The Newborn

Hay, J. D., et al., Lancet 1:423, 1951

Administration of vitamin K to pregnant women failed to materially lower the incidence of hemorrhagic disease in their newborn infants. This study involved 4602 subjects to whom vitamin K was administered and 12,131 controls. The incidence of hemorrhagic disease was 1 to 418 in the treated group and 1 in 527 in the control series.

U. Liverpool

Clinical Clippings, May, 1951.

The President's Column

By Louis W. Breck, M. D., El Paso
Southwestern Medical Association
President

Since I have been chosen to write the first article in this new short feature "The President's Column" I would like to comment on the fact that I think the idea of having this column is a very good one. As outgoing president of the Southwestern Medical Association this will be both my first and my last article. James Walsh of Douglas, Arizona, your new president, will write the next twelve in this series and I am sure he will take pleasure in writing them and that you will find his column most interesting.

I cannot think of a better subject to which to devote the first article in this column than that of the Southwestern Medical Association itself. The desirability and importance of our association has been apparent to everyone and is worth reflecting upon. The organization was founded as a regional one by the doctors in the Southwest and its need was great because of the long distances it was necessary to travel to reach a national meeting and because of the time and expense consumed in such travel. The organization gave the doctors in the desert Southwest a chance to get together to improve themselves medically in a good three day meeting, to get acquainted with one another, and to have a good time. Exactly the same things occur at the meetings held annually now. Traveling a short distance, hearing some good speakers and having a good time is what constitutes our meetings.

POLITICS IMPORTANT

We are all aware of the importance of the medical profession in politics, the importance of medical politics itself, the necessity of specialty meetings, state meetings, national meetings, and executive meetings of various types. The Southwestern Medical Association however, has no ulterior function. It is a pleasure to belong to an organization which has no serious purpose except to improve the minds of those attending the annual meeting.

Since the meeting place rotates among the major cities in the Southwest there is some variety of meeting place. In view of this fact one group is not put to the trouble of being host to the organization each year. In this way it is possible to be host one year and enjoy the trip to the convention at another city the next year. This would seem highly desirable because it is quite a burden to put on a meeting each year whereas a meeting every three years is a pleasure rather than a burden. The annual meeting is prepared for the general practitioner and the speakers are all leading men from the best medical centers in the United States.

HARDLY POSSIBLE

It seems hardly possible to get so much out of a meeting for so little effort, and we should all be aware of this. I will look forward to seeing an increasing number of you readers of this journal at each succeeding meeting of the Southwestern Medical Association and will close my remarks by saying that we should all work to make each successive meeting a little better than the last so that we may all enjoy the benefits of a highly educational and friendly regional meeting each year.

BAR PRESIDENT TALKS TO CHAVES PHYSICIANS

"The Physician and the Law" was the subject of discussion by Mr. J. M. Campbell, president of the Chaves County Bar Association at the regular October meeting of the Chaves County Medical Society following dinner at the Roswell Country Club.

Mr. Campbell's interesting and instructive remarks covered three phases: first, how the actions and behavior of the physician affects the law; second, how the law affects the physician and the physician-patient relationship; and third, some comments regarding the physician as a witness, expert or otherwise.

"Better liason between the medicine and legal professions is highly desirable. Even more important is adherence within the medical profession to the practice of The Golden Rule and honest physician-patient relationship," Mr. Campbell said.

E. W. LANDER
Roswell, Regional Editor

De Rebus Medicis Et Politicis

BY ROBERT B. HOMAN, JR., M. D., EL PASO, TEXAS
MEMBER OF THE HOUSE OF DELEGATES OF THE AMERICAN MEDICAL ASSOCIATION

THE DOCTOR'S RESPONSIBILITY

The constitution of the American Medical Association states that "the objects of the Association are to promote the science and art of medicine and the betterment of public health". The first sentence in the principles of medical ethics is the following: "The prime object of the medical profession is to render service to humanity". These two statements place great responsibilities on every member of the profession in the medical care problems faced in this modern world.

The doctor may no longer be content to practice medicine as an individual entirely independent of certain facilities and aids necessary in the present day care of patients. His "service to humanity" must include an intense interest in undergraduate medical education, nursing, hospitals, hospitalization and medical care insurance, as well as the necessary self-education to keep himself abreast of continued advances in the science of medicine and surgery. He must also concern himself with medical economics and with government encroachment on the profession's services.

CHIEF RESPONSIBILITY

Naturally, the chief responsibility of the doctor is the conscientious care of his patients. In the days of the country doctor this was a simple personal relationship in which the patient's "grandma" was apt to be both the nurse and the only available consultant. With the advances of science, the greater use and necessity of hospitalization for modern therapy, the advent of hospitalization insurance, and the era of specialization, the doctor-patient relationship of former times has become complicated. Truly, the practice of medicine continues to be "both an art and a science".

As the most important third party in the doctor-patient relation, the hospital deserves the closest co-operation from its medical staff. This does not refer merely to adequate care, and adequate patient's chart, and a good staff-meeting attendance record as the basis of co-operation between the individual doctor and the hospital. These are prerequisites of a basic formula tried and proved. But beyond these the doctor should concern himself with some of the problems faced by the modern hospital, which is his work-shop. The time is here when the doctor can no longer take the hospitals for granted.

BASIC PROBLEMS

The two basic problems of hospitals today are: 1. A shortage of graduate nurses. 2. High cost of operation during this inflationary period. Both of these problems should be of prime importance to every doctor for they directly affect the patient.

It has been estimated that there is a shortage of 40,000 graduate nurses in this country today. That is going to interfere considerably, as time goes on, with the doctor's ability to render proper care for his patients. Even with this knowledge, few doctors encourage young women to enter the nursing profession. On the other hand, too many doctors carelessly state that they would not advise anyone to be a nurse!

SECURE PROFESSION

The truth is that an R. N. has one of the most secure professions open to women. There practically never comes a time when the nurse cannot fall back on this profession in times of family financial emergency. There is no retirement age for a good nurse. It behooves every doctor, therefore, to encourage capable young women to enter training. The patient will benefit thereby.

Hospital costs are particularly susceptible to inflation, and are directly responsible for the increased cost to the patient for hospital services. The Consumer Price Index reveals that hospital rates are 135 per cent over the base 1935-39 period. In spite of this rise, many hospitals face operating deficits. The doctor should be seriously concerned with this problem and should make every endeavor to aid the hospital to operate as economically as possible. The economy will be reflected in the patient's total medical care bill. Any reduction in the cost of any commodity at this time would certainly be "a service to humanity".

SURGERY IN PULMONARY DISEASE

By Joseph W. Gale, M. D., University of Wisconsin, Madison

Pulmonary disease has offered a challenge to the surgeon for the past 50 years. Strange at is may seem, the thoracic cavity was the last one to be opened with any degree of confidence. One of the greatest contributions to the surgical principles involved in thoracic disease came during the First World War. The empyema commission clarified the physiological problems involved in the treatment of empyema. Since then progress in thoracic surgery has been rapid. Improvement in surgical technique, along with better anesthesia, has lowered the operative mortality. At the present time the risk of thoracotomy is no greater than that of exploratory laparotomy.

Before undertaking the surgical treatment of pulmonary disease it is mandatory that the attending physician have a fundamental knowledge of the physiological processes as they exist in the normal, and how these change when disease in its various forms occurs. The mechanics of respiration are important because of their alteration under different circumstances. They are not simple but must be understood. The thoracic cage is roughly triangular in shape, the apex of the triangle corresponding to the apex of the thoracic cage. The ribs at the apex are very short and their movement, on respiration, very limited. As the base of the triangle is approached, the ribs lengthen rapidly. The lower ribs have a greater excursion and are more vital in assisting efficient respiratory movements.

The semirigid thorax contains two of the most vital organs; namely, the heart and lungs. The lungs are enclosed in separate pleural cavities separated by the mediastinum which is a very flexable structure sensitive

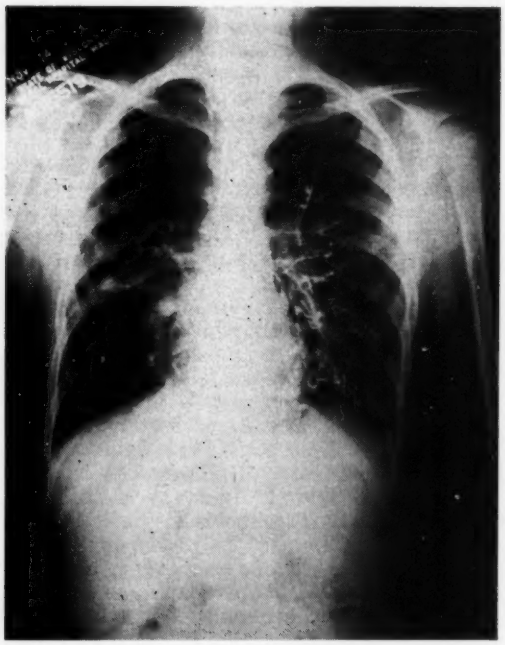

Figure 1: X-ray showing bilateral cystic disease involving the middle and lower lobes on the right and smaller cysts in the left lower lobe outlined by lipiodol.

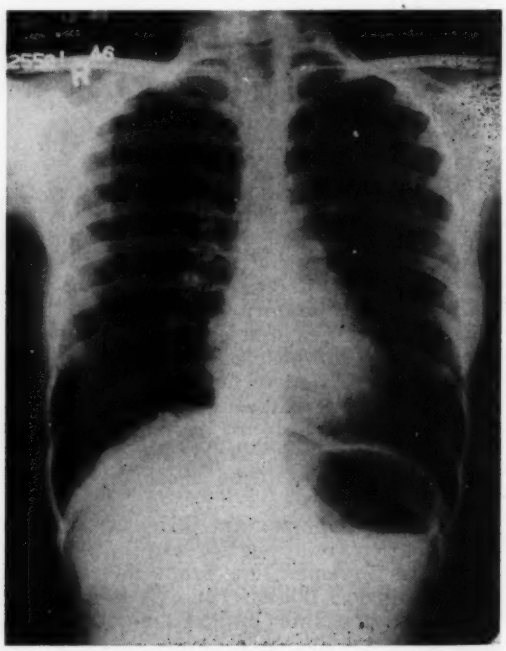

Figure 1a: X-ray showing presence of a large congenital cyst in the right upper lobe. Lesion was asymptomatic being discovered when a routine chest plate was taken.

to changes in intrapleural pressures. Each lung is normally under tension, its elastic fibers trying to pull it away from the peripheral parietal pleura. The tension exerted is sufficient to create a negative intrapleural pressure of —3.5 cm. of water with the lungs at rest. During inspiration the negative intrapleural pressure rises to —7.5 to —9 cm. of water. Equal pressures are maintained on both sides in health, and the mediastinum remains in the midline. Under such conditions the maximum efficiency of the respiratory movements is obtained.

During quiet respiration about 500 cc. of air is moved. Of this about 350 cc. reach the lungs; 150 cc. are needed to fill the trachea and bronchi. This volume of air is known as the tidal air. It increases with exercise. Ordinarily, at rest one uses only about 12.5 per cent of the available pulmonary capacity. The maximum amount of air that can be inspired over and above the tidal air is known as the complemental air and is roughly 2000 cc. Likewise, the maximum amount that can be expired after a normal expiration is known as the supplemental air. The lungs will still contain air, however, and this is known as the residual air. The lungs cannot be entirely emptied of air during life. The residual air is present at death. This is fortunate because under resting conditions the tidal air which supplies oxygen and carries away carbon dioxide constantly dilutes the residual air permitting prolonged contact with the alveolar walls. Otherwise the short contact during normal respiration would be insufficient for adequate chemical changes to take place.

The cardiovascular system is closely connected with respiration. During inspiration the increased negative intrapleural pressure assists in the filling of the right heart. At the end of inspiration about one-tenth of the blood volume is contained within the thorax and about one-twelfth at the end of expiration.

Many diseases affect the thoracic cage. Each lowers pulmonary efficiency in one way or another. Tumors crowd surrounding structures either by pressure or invasion, depending upon their structure. Air in the pleural cavity exerts pressure in all directions while fluid exerts the greatest pressure in the dependent portions. Many diseases resulting from congenital malformations, inflammation, and new growth offer varied problems. Some can be cured by surgery while others are not amenable to any type of treatment.

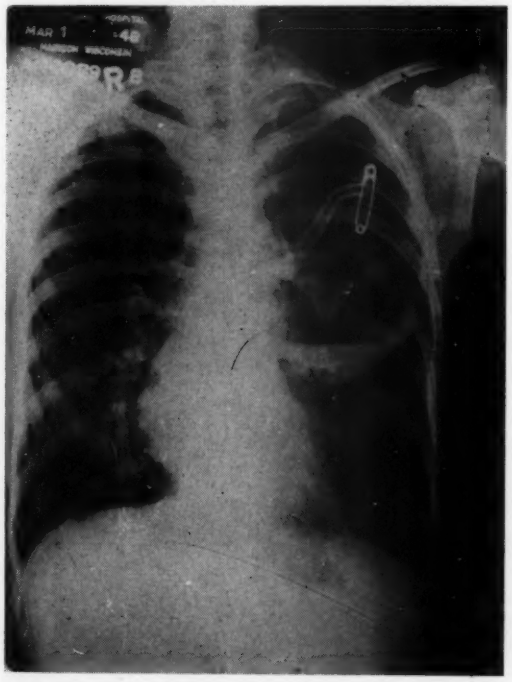

Figure 2: X-ray showing large infected cyst in left upper lobe. Patient had been operated upon for an empyema. Drainage tube present on admission. Lobectomy and recovery.

Figure 3: X-ray with lipiodol outlining the bronchi of the lower left lobe. Widespread cystic bronchiectasis in one lobe only. Left lower lobectomy with recovery.

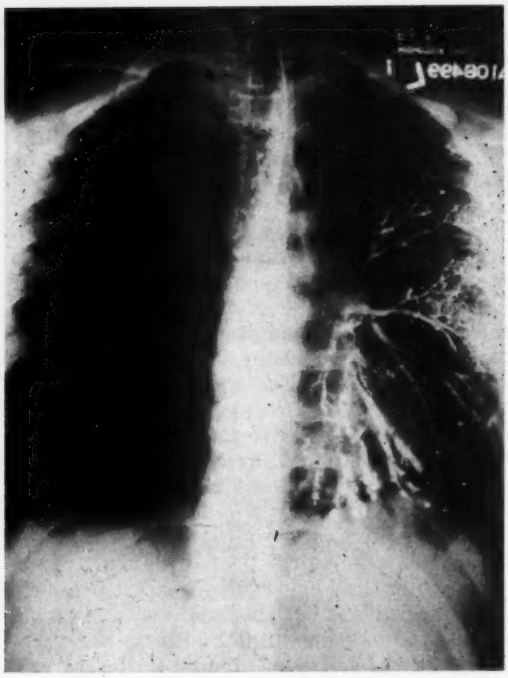

Figure 4: X-ray showing unilateral dendritic bronchiectasis demonstrated by lipiodol. Left lower lobectomy with recovery.

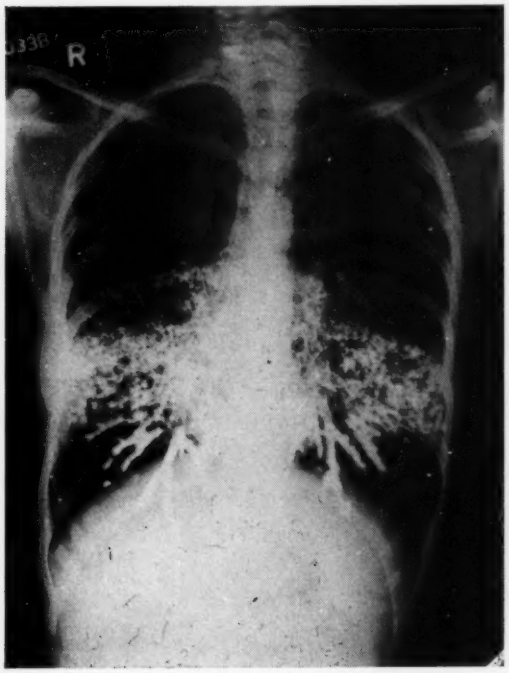

Figure 5a: X-ray showing bilateral bronchogram demonstrating right middle and lower lobe bronchiectasis, and also left lower lobe bronchiectasis and lingula of left upper lobe.

Before attempting to treat any disease, there are certain fundamental principles which must be applied in each case. A careful history and physical examination are obligatory. So often one can get a most lucid impression if care is exercised in this direction. Following the history x-rays are taken in various positions so that no hidden areas of the thorax are left unexposed. Bronchoscopy offers a method whereby the trachea and larger bronchial passages can be seen and examined. Bronchography, made possible by the instillation of lipiodol into the tracheobronchial tree, will map out the entire bronchial pattern showing at once if any abnormalities are present. Cytologic studies made of the sputum, pleural exudate, or bronchial secretions are also valuable, particularly in those cases where malignancy is suspected.

Some of the more common diseases of the chest which respond to surgical treatment will be mentioned. Congenital cystic disease, Fig. 1, once thought to be very rare, is seen more frequently since the efficient utilization of diagnostic procedures. It may be recognized immediately after birth if certain

Figure 5b: X-ray showing patient following the removal of the right middle and lower lobes followed eight months later by left lower lobectomy and lingula of left upper lobe. Sputum reduced from sixteen ounces to zero. Complete recovery.

mechanical and pathologic factors exist. One cyst, Fig 1, may be present. If the cyst is large and the ingress of air is free and the egress is limited or blocked, the infant may balloon the cyst to a point where it pushes the flexible mediastinum against the normal lung, resulting in pressure asphyxia. This condition should always be suspected along with congenital diaphragmatic hernia in infants with respiratory difficulty. Congenital cystic disease may exist as multiple small cysts, Fig. 1a, uni-or bilateral. This developmental defect of the lungs reduces the respiratory efficiency and is not infrequently associated with other congenital abnormalities, particularly of the kidney. Signs and symptoms may not occur until later in life, but the acute exanthemata and their complications of a respiratory nature may result in a chronic infection of the cyst or cysts, Fig. 2. The disease may go unrecognized for months or years. Proper study, clinical and roentgenological, will clinch the diagnosis. Such a diagnosis calls for a close observation to determine if removal of the diseased lobe or lobes is advisable. In many cases this can be successfully carried out, while in some instances both lungs will be found to be so extensively involved and the vital capacity so limited that operation is ill-advised. Another condition closely associated is cystic

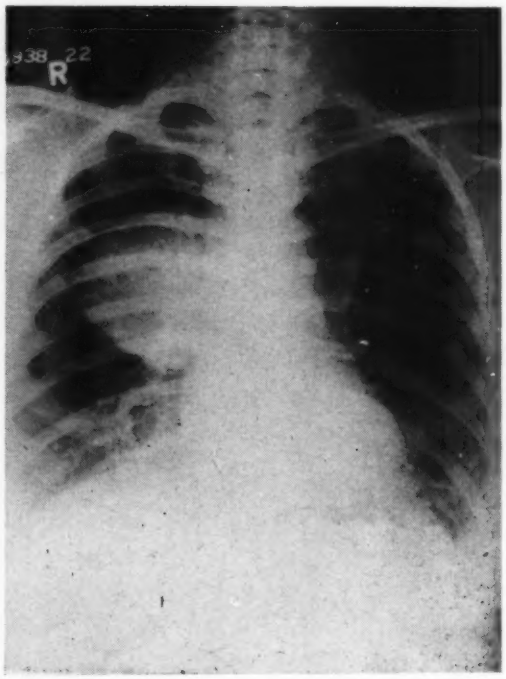

Figure 7: X-ray showing mediastinal mass, spheroid in shape. Lateral view shows it to be in anterior mediastinum. Removed by thoracotomy. Filled with hair and sebaceous material. Diagnosis: dermoid cyst.

Figure 6: X-ray showing massive empyema on left side. Heart and mediastinum shifted to right restricting efficiency of right lung.

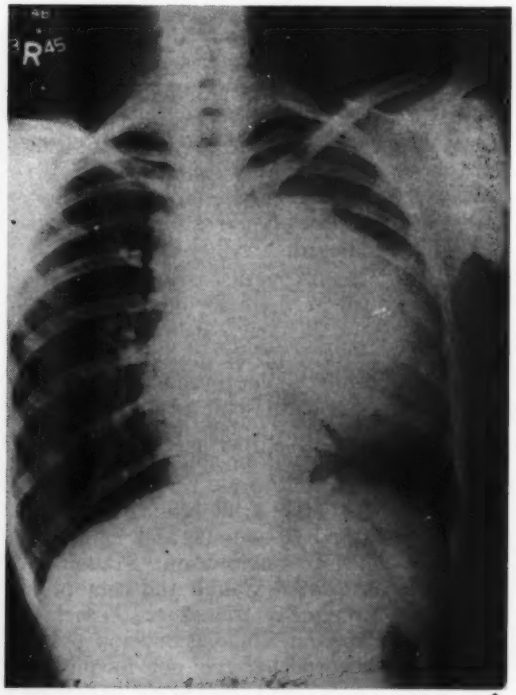

Figure 8: X-ray showing large mediastinal mass occupying a large amount of the pleural space compressing the left lung. Removed by thoracotomy. A cyst containing cartilage, thyroid, bone, glands, etc. Diagnosis: dermoid cyst.

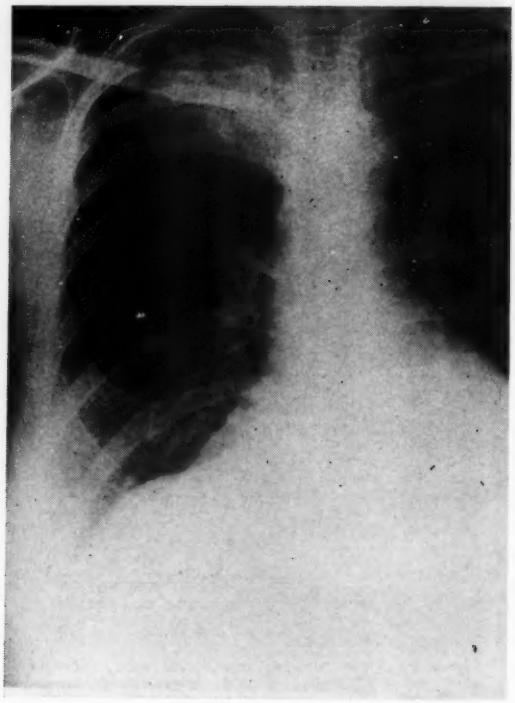

Figure 9: X-ray showing large sharply outlined spherical mediastinal tumor. Lateral view showed tumor to be posterior. Removed neurofibroma.

bronchiectasis, Fig. 3. Ordinarily it is more likely to be localized to one or two lobes. Some observers feel that the two conditions are the same and simply a matter of degree of involvement. Surgery where indicated has been most successful in restoring these patients to good health.

The inflammatory diseases of the lungs have lost much of their seriousness because of advances in surgery. Bronchiectasis, which is a chronic inflammatory disease of the bronchi and the contiguous lung parenchyma, presents a difficult problem, Fig. 4. Individuals with this disease may have a copious putrid, foul-smelling sputum which will necessitate their withdrawing from society, Fig. 5a and 5b. They are victims of frequent acute respiratory infections, and longstanding cases develop amyloidosis. Sinusitis is frequently associated. Cough and hemoptysis are almost constantly present. Associated fatigability, anemia, emaciation, and pulmonary osteoarthropathy are not uncommon. For many years panaceas were prescribed in no fewer numbers than those for acute coryza. It was finally learned through trial and error that the most efficient treatment was the removal of the disease process. Resection of one or more lobes can be accomplished in stages, and as high as three of the five lobes have been successfully removed for this disease. Unless, as mentioned before, we had a great pulmonary reserve these procedures would be impossible.

Lung abscess has always been feared by the internist and surgeon. The mortality has been appalling in the past. Many patients survived the acute pneumonic stage of their disease only to reach a chronic impasse not unlike that seen in bronchiectasis, all the complications of the two diseases being quite similar. During the past 15 years, as in bronchiectasis, it has been found that abscesses that do not heal within three to six months can be most successfully treated by resection of the diseased lobe.

Empyema, although not strictly a pulmonary disease, exerts its effects upon lung efficiency so markedly that it must be mentioned, Fig. 6. It does not occur so frequently since the introduction of sulfonamides, penicillin, etc. Occasionally it is encountered and the percentage of chronic cases seen in later

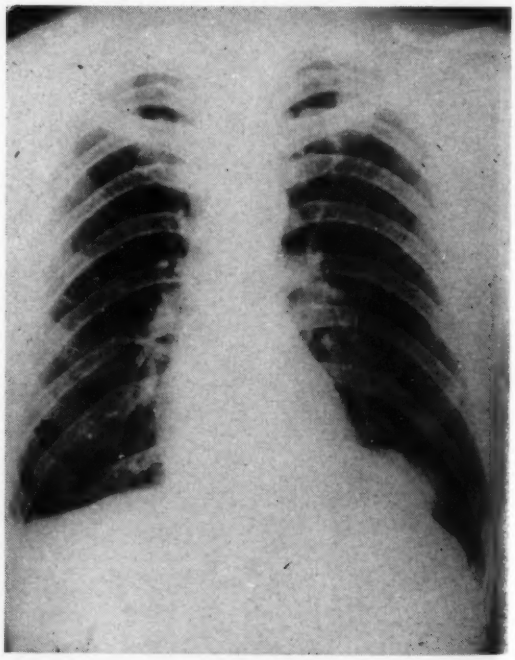

Figure 10: X-ray showing ovoid tumor extending lateral to pericardium and resting on dome of diaphragm. Lateral view located it anterior. Removed. Diagnosis: pericardial cyst (spring water cyst).

years is far greater than before. In many instances too much confidence has been placed in chemotherapy and in some cases it has been looked upon as the universal cure-all. Empyema occurs as a complication of or as a sequel to pneumonia. It starts as a serous or serosanguineous pleurisy. If recognized early, repeated thoracenteses over a period of 10-12 days with the instillation of penicillin may control the formation of pleural exudate and restore the lung to the expanded state. Once frank pus or empyema is present, chemotherapy is usually ineffectual. Adequate, dependent and continuous drainage by thoracotomy is the treatment of choice. This permits sterilization and obliteration of the cavity. If pus persists in the pleural space, the underlying collapsed lung is fixed by fibrinous, later fibrous, adhesions. The only way to restore the lung to its normal state is through drainage by rib resection and decortication or removal of the fibrous peel holding the lung in the collapsed state.

Mediastinal tumors must be considered, since through their growth pressure, invasion, and ulceration into surrounding pulmonary tissues may occur. The most common type seen, and ordinarily the most benign, is the dermoid cyst, Fig. 7. This tumor is most frequently found in the anterior mediastinum in young individuals. It develops slowly, pushing surrounding structures to the side. It may reach proportions sufficient to cripple an entire lung. Due to its slow growth it may remain relatively asymptomatic. The first evidence of the growth may occur when it erodes the trachea or esophagus and the patient coughs up or vomits hair. Other mediastinal tumors including teratoma, Fig. 8, which is more apt to become malignant, neurofibroma, Fig. 9, lymphomata, pericardial cyst, Fig. 10, thymoma, mediastinal thyroid, Fig. 11, and lipoma, are all best treated by surgery. Eventration of the diaphragm may be an exception, Fig. 12.

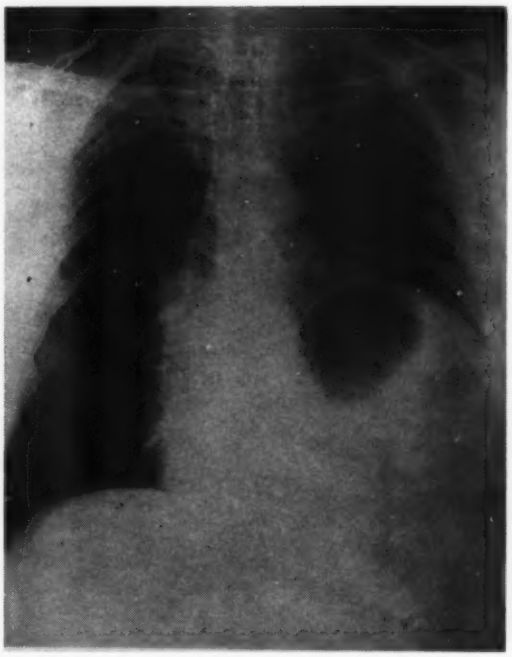

Figure 12: X-ray showing extremely high diaphragm on left in male 68 years of age. Heart and mediastinum pushed to right. Dyspnea on exertion. Treatment: limited activity. Diagnosis: eventration of left diaphragm.

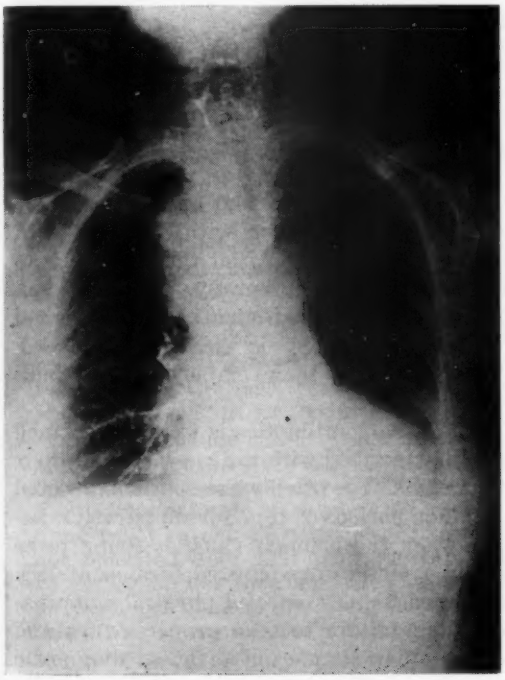

Figure 11: X-ray showing large mediastinal mass extending to the right causing pressure on trachea outlined by lipiodol. Patient treated for decompensation with digitalis before entry to hospital. Thoracotomy with removal. Diagnosis: mediastinal thyroid.

Trauma of the chest and its contents presents many problems so far as surgery is concerned. Traumatic pneumothorax, Fig. 13a and 13b, hemothorax, flail chest, spontaneous pneumothorax, and many other conditions may occur including fungus diseases such as coccidiomycosis, Fig. 14. It is not within the scope of this paper to consider each and every one. Surgical interference has proved its value in all, under certain conditions.

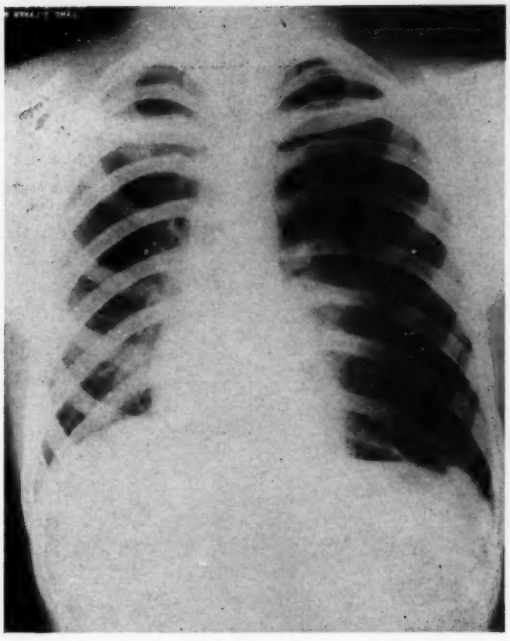

Figure 13: X-ray showing collapsed left lung following exertion. Lung re-expanded. Diagnosis: spontaneous pneumothorax.

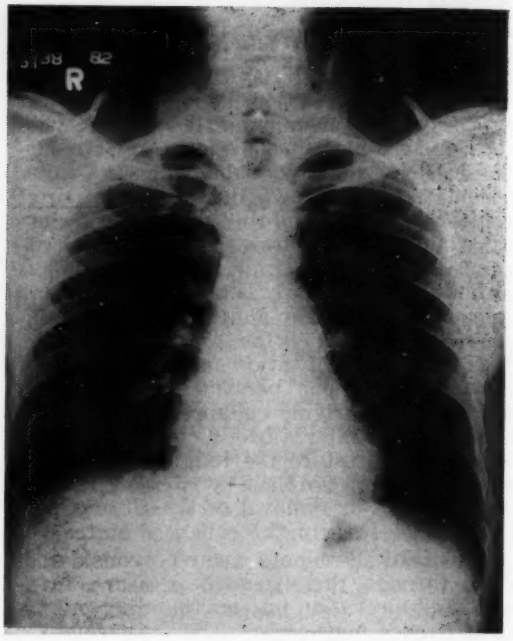

Figure 14: X-ray showing thin walled cavity, lower left lobe. Hemoptysis. Diagnosis: coccidiomycosis. Segmental resection of left lower lobe with recovery.

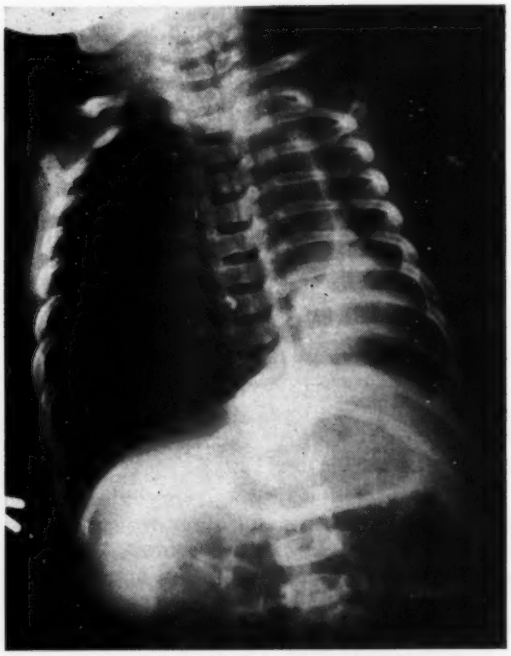

Figure 13a: X-ray of eight day old infant showing completely collapsed left lung and extensive herniation of mediastinum. Etiology? Recovery following air tight intercostal catheter drainage.

Tumors of the lung including bronchogenic carcinoma, adenoma, hamartoma, bronchial cysts, and adenomatosis, likewise offer many interesting surgical problems.

The role of antibiotics in thoracic surgery has been a most important one. Their value is indisputable if given with care and with a clear understanding that they are only an adjunct to definitive therapy. Their efficiency in altering and attenuating the bacterial flora preoperatively is clearly established. Postoperatively, their employment is indicated.

The use of antibiotics is to be condemned unless prescribed with the knowledge of their limitations. Too often we see patients treated over long periods of time for suppurative disease when the primary cause is found to be a new growth, unrecognized because of lack of a good history, careful physical examination, and failure to take proper x-rays and to use other simple but efficient diagnostic procedures. The judicious use of all available methods and the careful, controlled administrations of effective therapeutic agents will soon reduce the fear so long associated with diseases of the pulmonary system.

NONPENETRATING INJURIES OF THE ABDOMEN*

By Charles J. Miangolarra, M. D. ** and Claude C. Craighead, M. D. ***
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INTRODUCTION

During the period between Dec. 31, 1942, and Jan. 1, 1950 there were 64 serious injuries to abdominal organs caused by blunt trauma to the abdominal wall treated at the New Orleans Charity Hospital. This is not a large number when one considers that nearly 100,000 patients are seen yearly in the hospital's accident room. Since the mortality from these injuries remains so high it seems appropriate to call attention to them from time to time.

Our study of the 64 records, in most instances, bore out the observations of others who studied similar groups of patients. However, in some instances we have had to draw different conclusions. Much of what is said in this paper is based on the study of these records.

Eighty per cent of the injured were male. Ages varied widely — from birth to 80 years. Nearly one-half occurred during the first two decades of life and over two-thirds during the first four decades. Four individuals were over 70.

MOTOR VEHICLES

The principal causative agent was motor vehicles. These caused nearly 50 per cent of the injuries. Blows to the lower chest and abdomen were second and falls were third. Five were birth injuries while two were the result of too vigorously applied artificial respiration. The last were dead before the abdominal injuries occurred.

If we exclude three premature infants and the two respiratory deaths, the mortality for the remaining 59 cases is 40 per cent. Forty-four patients were operated upon with a mortality rate of 27 per cent. Fifteen were not operated upon and their mortality was 93 per cent. For those operated upon within twelve hours of receiving the injury the mortality was 16 per cent. Those operated upon after 12 hours had a 23 per cent mortality rate.

Sudden severe trauma is more likely to produce injuries to the solid organs, i.e., the liver, spleen, pancreas, and kidneys, than is slow compression. This can be explained on the partial fixation these organs possess, enabling them to tolerate slowly applied pressure well. The rareness of pancreatic injuries can be appreciated by our failure to discover any in our series and the small number reported elsewhere. If the pancreas is involved, there is usually severe damage to other viscera with an immediate fatal termination. The spleen and liver are more frequently injured.

LIVER

The experiences recorded in World War II have assisted materially in emphasizing earlier diagnosis and in crystallizing the proper management of liver injuries. Sheddon and Johnston[17] have classified liver injuries into three groups: (1) rupture of liver tissue with simple laceration of Glisson's capsule; this represents minimal trauma; (2) separation of the capsule by subcapsular hemorrhage and damage to the parenchyma; (3) central rupture with hemorrhage into parenchyma followed later by abscess formation.

While most subcapsular hematoma and small lacerations of the liver will seal themselves off and not require surgical intervention, as was true of war injuries, Rob[14] reporting only one of 34 perforating cases requiring surgical intervention to control hemorrhage, those that are caused by blunt trauma are more serious and many times will demand surgery. The latter usually result in profuse bleeding and the syndrome present after a short time is one of massive intraperitoneal hemorrhage.

Finsterer[7] noted many years ago that there was often an associated bradycardia but this is not of diagnostic import, its occurrence being observed in other intra-abdominal catastrophies, nor is it readily explicable except possibly on the basis of vagal stimulation. The blood pressure may be maintained for a considerable length of time; however, the usual finding is a fairly close correlation between the blood pressure readings and the degree of clinical shock.

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PHYSICAL SIGNS

Depending on the amount of intraperitoneal bleeding, physical signs pointing to its occurrence become patently manifest. Small amounts cannot be detected. Extravasation into the periumbilical area and flanks has been commented upon by Cullen and Grey Turner. Percussion of shifting dullness does not, in our opinion, contribute greatly to the diagnosis and may do harm by dislodging a delicate clot insecurely perched on a recently bleeding liver surface, thereby precipitating severe hemorrhage. Nor do we encourage abdominal wall puncture for the diagnosis of hemoperitoneum.

Blood studies in the first few hours have not proven to be of much assistance to us in determining the severity of hemorrhage. We have depended greatly on our own observation of the patient and an accurate appraisal of his general condition for the diagnosis and the decision to operate or to wait.

LATER MANIFESTATIONS

Later manifestations of liver injury are jaundice, peritonitis, abscess formation, and the toxic effects from liver necrosis.

When there is evidence, or even suspicion, that progressive bleeding is taking place within the abdomen, operation is imperative. A generous incision should be made to permit complete exploration of all abdominal organs and, if necessary, examination of the retroperitoneal spaces. Control of bleeding from a torn liver surface is not always easy, is often trying, and may be most difficult to accomplish. Mattress sutures of catgut on atraumatic or specially designed liver needles sometimes are sufficient to stanch the flow. However, packing must be resorted to frequently. Long narrow strips of gauze placed against the raw surfaces will arrest hemorrhage and provide for drainage. One of the newer hemostatic agents may be used in conjunction with the pack, although these agents may enhance liver sequestration. Whether packs or sutures are used, drainage is imperative.

Associated tears of the right diaphragmatic leaf and the liver, usually caused by indriven fragments of ribs, are not uncommon. This type of injury, irrespective of the severity, in view of the morbid and sometimes fatal cholethorax which follows in its wake, should be handled by transthoracic repair of the diaphragm and supra and infradiaphragmatic drainage.

One of the late complications we have encountered is persistent bile fistula at the site of drainage. Sloughs of considerable liver substance form sequestra and until these are removed surgically, the fistula will persist.

SPLEEN

Nestling high under the protecting diaphragm and rigid chest cage, this moderately small organ would appear to be invulnerable to injury. This is not true. It is one of the most frequently injured abdominal organs. The architecture of the organ is such that even mild trauma may result in tearing of its soft parenchyma. Unlike small wounds of the liver, once tearing of splenic tissue has occurred, there is a tendency for bleeding or oozing to continue for a long time.

Clarkson[2] divides injuries of the spleen into three groups. In the first group, rupture is followed immediately by massive hemorrhage which rapidly progresses to a fatal issue, the spleen often being cut adrift from its pedicle, torn in half, or reduced to pulp, and the abdominal cavity filled with blood. In the second group are placed those ruptures with initial hemorrhage and collapse, then recovery. After a latent period, usually hours, hemorrhage again occurs which without splenectomy will result in death. In the third group are placed the subcapsular hematomata. In these the splenic pulp is torn under an intact capsule. These are dangerous. While the bleeding continues and pressure under the capsule increases, there is a period of two to ten or more days when the patient seems to have no serious intra-abdominal injury. When all seems perfectly well within the abdomen, the hematoma breaks through the capsule and profuse hemorrhage occurs. One ruptured spleen treated recently on the Louisiana State University surgical service had a silent interim of fourteen days following an automobile accident. Recovery followed splenectomy.

DIAGNOSIS DIFFICULT

An accurate diagnosis of splenic rupture frequently is impossible to make. The nature and site of the injury, combined with pain, tenderness, and rigidity, will direct attention to the abdomen. At times these symptoms predominate in the left upper quadrant, indicating that the spleen most likely has been injured. Added to these are the signs of intra-abdominal hemorrhage. These factors indicate the probability of splenic injury. Pain in the left shoulder (Kehr's sign) may be present, although it was not recorded in any of our cases. Decrease in the respiratory excursion on the left side may be due to rupture of the spleen, fracture of the lower ribs, or both. The possibility of splenic rupture with early or delayed hemorrhage must be borne in mind in all patients with rib frac-

tures on the left side. Levine and Solis-Cohen hold that x-ray examination of the abdomen is an aid in the diagnosis of the lacerated spleen. In a typical case the following changes may occur: increased density in the left hypochondrium; elevation of the left leaf of the diaphragm; and displacement of the stomach to the right side.

Abdominal exploration is indicated when injury of the spleen is suspected. Splenectomy is advised even in patients with hematomata for reasons that have already been stated. Careful examination of the left diaphragm and left lobe of the liver for rupture should invariably be done because the lesions are sometimes associated.

KIDNEY

Campbell[1] estimates that the relation of renal trauma to surgical admissions is 1:3000. He considers hydronephrosis, calculi, and long standing urinary tract infection as predisposing factors. Ninety per cent of kidney injuries occur in the male.

Injury of a kidney by blunt force is recognized more readily than liver and spleen injuries. Hemorrhage from an injured kidney will remain outside of the peritoneal cavity and produce a fullness in the region of the organ. Hematuria will be present unless the ureter is divided or the renal blood supply cut off by division of the pedicle or massive renal thrombosis. Intravenous pyelograms are extremely helpful to determine the degree of renal damage, existence of perirenal extravasation, and the presence and function of the other kidney.

Conservative treatment should be used when there is mild hematuria, no increase in the size of the mass in the lumbar region, and the blood pressure hourly remains stationary. Surgical intervention is indicated when there is evidence of extensive damage to the kidney or ureter, or when there is progressive hemorrhage, or extravasation of urine. Total or partial resection will depend upon the amount of damage found and the presence of another functioning kidney. Adequate drainage should always be provided.

PANCREAS

Non-penetrating injuries of the pancreas are uncommon. Shallow and Wagner[16], after a study of their 28 cases and the reported series of acute pancreatitis, determined that trauma plays a part in from two to four per cent of the cases. Because the pancreas is soft and very vascular, mild force applied anteriorly may cause injury. According to Venable[19], the tear or rupture that occurs may be complete or incomplete, and may divide the duct of Wirsung. The latter usually results in the formation of abscess or pseudocyst. Hemorrhage that follows rupture remains retroperitoneal and forms a mass above the umbilicus.

The diagnosis is made on the following findings: (1) Presence of moderate to very severe pain in the upper abdomen following trauma; (2) development of a mass above the umbilicus; (3) after a short time a large collection of ascitic fluid; (4) a rapid early rise in serum amylase (high normal 180 Semogyi units). Edmonson and Burne[4] found the serum calcium below nine milligrams per 100 cubic centimeters if there is a hemorrhagic element; values below seven indicate a fatal outcome.

Treatment by conservative measures should be employed as long as there are signs of clinical improvement. Patients who do not improve but seem to get worse during a six to eight hour period of observation should be explored. Adequate drainage should be established to prevent the spread of peritonitis and the formation of abscesses and pseudocysts.

INJURIES OF THE HOLLOW VISCERA

It is interesting to note that in our study of the records of 64 patients with nonpenetrating trauma to the abdomen not a single case showed injuries to the solid viscera and to the intestinal tract at the same time. However, there were several who had ruptures of the urinary bladder combined with liver and spleen injuries. Perhaps those who sustained the first combination were so severely injured that death occurred before the victims could reach the hospital. The remarks concerning the diagnosis and management of injuries to the hollow viscera are based on the assumption that these injuries only rarely occur in conjunction with ruptures of the liver and spleen.

While the syndrome of intraperitoneal hemorrhage is paramount in tears of liver and splenic tissue, it only assumes importance with gastrointestinal injuries when severe mesenteric tears are present. Thus the syndrome changes from that of hemorrhage to one of peritoneal reaction to chemical irritation and to bacterial invasion. "The pseudoperitoneal syndrome" or "traumatic peritonism" of Eliason and Hinton[5,8] occurring immediately following injuries of the chest and retroperitoneal areas may be misleading. Fortunately the confusing signs improve early while those of true peritonitis become progressively worse with time.

CERTAIN AREAS

Hollow viscera are more susceptible to injury when distended and also when dis-

eased. There are certain areas, principally the fixed portions; such as, the duodenum, the upper jejunum, and the ileocecal region that are more prone to receive tears.

From our study of the records of the patients in this series with gastrointestinal and mesenteric tears we conclude that sharp blows, particularly kicks, are apt to injure the intestines. Veal[18] observed that many of the tears are at the mesenteric attachment and explained their occurrence by the force causing the bowel to move away until suddenly arrested by the mesentery. Ruptures occur when compression force is applied to viscera such as the stomach, colon, and bladder while they are distended. Indriven fragments of fractured pubic bones frequently account for bladder lacerations. Enemata given with too much hydrostatic force or taken directly from water taps account for some of the large bowel injuries seen in emergency rooms.

The stomach, the peritonealized portion of the duodenum, and the upper jejunum when ruptured cause immediate reaction on the part of the peritoneum to produce such a dramatic clinical picture that the urgent need for surgery is very evident. The pronounced symptoms and signs and the presence of gas under the diaphragm afford early diagnosis and early surgical therapy.

MASKED INJURIES

Injuries of the retroperitoneal duodenum are likely to mask themselves since free gas in the peritoneal cavity and marked peritoneal reaction are absent. Careful search for gas in the region of the right kidney will often reward the observer with an early diagnosis. More frequently, however, the true nature of the injury is not suspected until a retroperitoneal abscess forms. The mortality from these injuries is extremely high.

Ruptures of the lower jejunum, ileum, and colon may show long latent periods between acquisition of the trauma and the appearance of symptoms and signs that show the serious nature of the injury. Small tears, without eversion of the mucosa, are easily overlooked because they tend to seal themselves temporarily, only to reopen later with injudicious purgation or from the pressure of an enema. Too many patients are improperly observed because the trauma seems trivial and because recovery from its immediate effects has been so rapid. Many of these return days later in shock from the spreading peritonitis present.

While the presence of free gas is helpful in identifying injuries of the colon, it is usually not present with tears of the lower jejunum and ileum.

IMPORTANT FINDINGS

Among the most important findings that point to injury of the gastrointestinal tract are: (1) the history and site of the trauma; (2) localized pain, tenderness, and rigidity, which persist with a tendency to spread; (3) absence of peristaltic sounds; (4) the quiet attitude of the patient; (5) loss of abdominal respiratory movements; (6) a rising pulse rate; (7) persistent vomiting; (8) the extremely important sign of air or gas free in the peritoneal cavity or in the region of the right kidney; (9) a rapidly increasing leucocytosis, with polymorphonuclear leucocytes predominating; (10) abnormalities of the hematocrit, hemoglobin, red cells, and specific gravity of the blood. Absence of one or more of these does not rule out the existence of serious injury.

While injuries of the gastrointestinal tract are true emergencies exploratory laparotomy is not as urgent as with progressive intra-peritoneal hemorrhage. Therefore, we are allowed a short interval for a more adequate study of the situation at hand. We realize that these patients tolerate moving poorly, but the majority will permit adequate x-ray studies. Examinations should be done with the patient supine, prone, in the right and left lateral, and upright positions for the presence of free gas. The absence of free gas with clinical evidence of gastrointestinal injury points to tears of the lower jejunum and ileum.

EXPLORATION

Regardless of what laboratory data show, if in the opinion of the surgeon injury to the abdominal viscera has not been completely eliminated, he should proceed with exploration immediately; remembering that the next positive sign might be spreading peritonitis.

The treatment of urinary bladder injuries belongs to the urologist; yet, the diagnosis of their presence is the responsibility of the general surgeon. Fractures of pelvic bones are not always present with bladder injuries. Only two of five cases treated at Charity Hospital during recent years had pubic bone injury. This injury can usually be identified by: (1) the presence of shock, which is usually severe; (2) suprapubic pain; (3) signs of extravasation of urine into the peritoneal cavity or into the tissues of the abdominal wall; (4) hematuria, dysuria, or anuria; (5) abnormalities of the cystogram, using contrast media; and (6) fractures of the pelvis demand investigation for bladder injury.

CONCLUSIONS

1. Severe injuries of abdominal viscera, while not common, can occur from ap-

parently mild trauma to the abdominal wall. When associated with other injuries, the mortality is very high.

2. Severe injuries of the spleen occur more frequently from blunt trauma to the abdomen than severe injuries of the liver.
3. Splenectomy is advised for hematomata, as well as for open lacerations, to prevent future rupture of the capsule followed by profuse and often fatal hemorrhage.
4. Liver injuries are more frequently associated with other abdominal injuries and result in a high percentage of fatalities. All liver wounds operated upon should be adequately drained.
5. Ruptures of the ileum and retroperitoneal duodenum are more difficult to recognize than those of the stomach, peritonealized portion of the duodenum, and the upper jejunum and are, therefore, more deadly to the patients.
6. Some intraperitoneal injuries have silent or latent periods between the acquisition and the appearance of important symptoms and signs. Because of these, we believe that observation for twenty-four hours is inadequate. Purgation should not be used for at least seven days after acquiring trauma.
7. Last, but not least, is the consciousness of their occurrence, particularly with relatively mild trauma, their association with other injuries, and the adoption of an orderly plan for their investigation and treatment.

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